

Tech Info Library

Apple IIe: Component diagnostics (1 of 2)

Revised: 7/2/87
Security: Everyone

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Apple IIe computers have built-in diagnostics used during manufacturing. You may invoke the diagnostics by holding down the solid-Apple key while powering the system on, or by unplugging the keyboard and turning the Apple IIe on.

If you depress both the solid and open-Apple keys while powering the system on, the same diagnostics will be run along with a high-pitched tone.

The tone or beep, included in a machine language loop that tests the computers IOU and MMU, merely indicates that the speaker I/O location does indeed work. Because the Apple II performs the IOU/MMU test a random number of times, the beep sounds a random number of times. In addition, the diagnostic routine varies between the Apple IIe, Apple IIe enhanced, and Apple IIc.

The diagnostics test the motherboard's RAM as well as a number of unique LSI components (MMU, IOU, and other ROMs) on the board. If the keyboard is connected, the diagnostic will run through the series of individual tests once. If the keyboard is not connected, the test runs continuously until the system is powered off.

The ICs are tested in the following order: MMU, IOU, E8 ROM, E10 ROM, the eight RAM chips. "Kernel OK" appears on the screen if everthing passes the diagnostic.

Note: The diagnostic stops and hangs the processor with the first error detected. There may be subsequent problems in the system; they will go undetected until the first problem is fixed.

Here are some error messages and what they mean:

```
MMU   FLAG E4:0  The Read Lang Card Bank0 switch didn't
                 initialize properly during reset.
              1  The Read Lang Card RAM switch didn't
                 initialize properly during reset.
              2  The RAMRD switch didn't initialize
                 properly during reset.
```

```
               3  The RAMWRT switch didn't initialize
                  properly during reset.
               4  The ALTZP switch didn't initialize
                  properly during reset.
               5  The C3ROM switch didn't initialize
                  properly during reset.
               6  The 80STORE switch didn't initialize
                  properly during reset.
               7  The Read Lang Card Bank0 switch
                  won't change.
               8  The Read Lang Card RAM switch
                  won't change.
               9  The RAMRD switch won't change.
               A  The RAMWRT switch won't change.
               B  The ALTZP switch won't change.
               C  The C3ROM switch won't change.
               D  The 80STORE switch won't change.
```

If you receive an MMU FLAG E4 error number, suspect the MMU at location E4.

```
IOU   FLAG E5:0  The 80VID switch didn't initialize
                  properly during reset.
               1  The ALTCHAR switch didn't initialize
                  properly during reset.
               2  The TEXT switch didn't initialize
                  properly during reset.
               3  The PAGE2 switch didn't initialize
                  properly during reset.
               4  The MIXMODE switch didn't initialize
                  properly during reset.
               5  The HIRES switch didn't initialize
                  properly during reset.
               6  The 80VID switch won't change.
               7  The ALTCHAR switch won't change.
               8  The TEXT switch won't change.
               9  The PAGE2 switch won't change.
               A  The MIXMODE switch won't change.
               B  The HIRES switch won't change.
```

If you receive an IOU FLAG E5 error, suspect the IOU at location E5.

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